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FURTHER OBSERVATIONS OF THE CENTRAL STAR IN THE PLANETARY NEBULA NGC 2346

Visual and photographic observation of this unusual object reported previously (Marino and Williams, 1982, 1983) has continued at Auckland during the 1983 observing season, using the same equipment and observing procedures. We present in Table I a summary of the new photographic estimates, and in Table II six sets of three colour UBV photoelectric measurements made at the Auckland Observatory by Walker and Marino.

Table I

Photographic observations of the central star of NGC 2346 during 1983 January to May

J.D. 2445000+	m_v	J.D. 2445000+	m_v
337.9	12.6	387.9	13.8
339.9	13.4	393.8	fainter than 14.2
340.9	fainter than 14.2	398.9	" 14.0
341.9	" 14.2	400.9	12.9
342.9	" 14.2	403.8	13.7
343.9	" 14.2	408.9	fainter than 14.2
344.9	" 14.2	414.8	14.0
345.9	" 14.2	421.9	fainter than 14.0
348.9	" 14.0	422.9	" 14.0
349.9	" 14.2	423.8	" 14.0
350.9	14.2	425.8	" 14.0
351.9	12.8	433.9	13.4
352.9	12.7	434.8	14.0
353.9	12.5	435.9	fainter than 14.0
354.9	12.4	452.8	" 14.0
355.9	12.9	455.8	" 14.0
359.9	fainter than 14.2	463.8	" 14.0
374.9	" 14.0	467.8	" 14.0
382.9	13.5	468.8	" 14.0
383.9	13.1	471.8	" 13.6
384.9	13.0	478.8	" 14.0

For the photoelectric observations the equipment was the Auckland Observatory 50 cm Edith Winstone-Blackwell telescope with the Mark I photometer using an EMI 9502 photomultiplier tube, standard UBV filters, and operating in photon detecting mode. The method of observation and reduction was the same as has been described previously (Marino, 1971). HD 55185, V = 4.14, B - V = -0.01, U - B = -0.01 (Cousins and Stoy, 1963) was used as the primary

comparison star. The values given in Table II include the background nebulosity of NGC 2346 within the 31 arc second aperture used for the observations. No attempt has yet been made to extract the nebulosity which is a substantial contributor to the brightness in each of the three colours.

Table II

Three colour photoelectric observations of the central star of NGC 2346 including background luminosity in a 31 arc second aperture

J.D. 2445000 +	V	B-V	U-B	Notes
400.931	11.90	+0.64	-0.23	
400.938	11.77	+0.61	-0.12	
400.976	11.84	+0.48	-0.08	
403.857	11.99	+0.76	-0.28	
403.881	12.31	+0.69	-0.57	
414.883	12.43	+0.61	-0.61	no visible stellar image

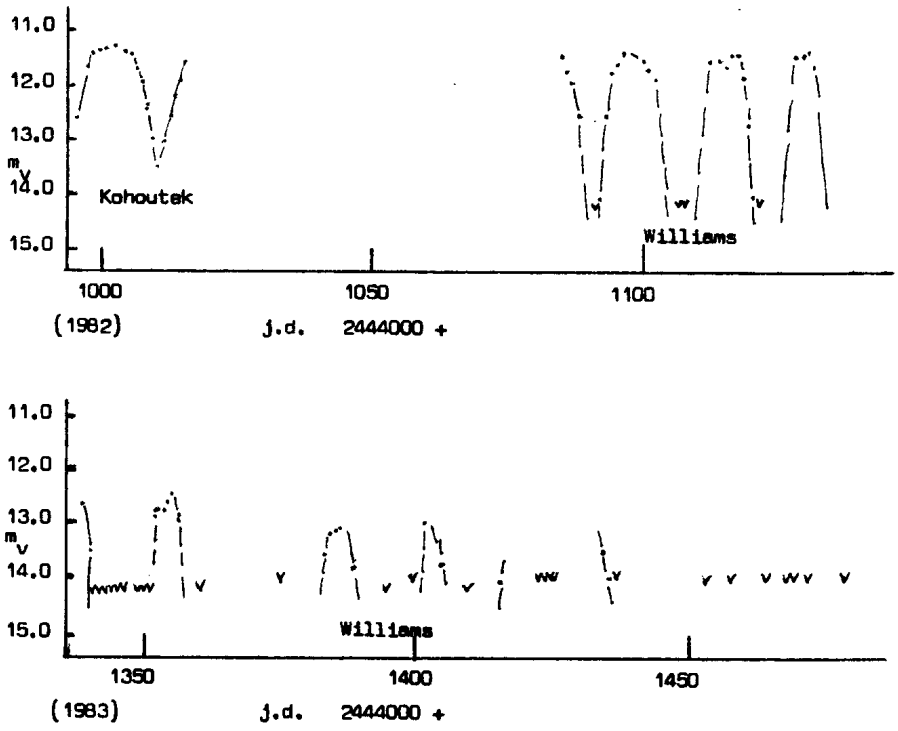

Figure 1

Light curves of the central star in NGC 2346 during the two observing seasons 1982 and 1983

The 16 day periodicity observed during 1982 has continued. However the total light curve has become more and more suppressed with time until only very short faint peaks around 14th magnitude are visible at the end of the current observing season. For the remainder of the cycle the central object is below visiblity threshold or lost within the background nebulosity. The suppression of brightness is illustrated in Figure 1, which shows the earlier 1982 date and the 1983 photographic results.

Mendez et al. (1982) have proposed a model for the eclipsing type behaviour observed in 1982. The data here have been submitted to them for inclusion in a coordinated investigation of the behaviour during the current season. Observing will continue in the 1983-84 season, in the hope that a clearing of the obscuring feature and a return to the pre-1982 magnitude level may be observed.

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